

REMARKS

The Office Action mailed April 6, 2004 has been carefully considered. Reconsideration in view of the following remarks is respectfully requested.

Applicant hereby requests acknowledgement of the Information Disclosure Statement filed September 19, 2001. A copy of the 1449 form and OIPE-stamped postcard receipt showing receipt by the Patent Office on September 21, 2001 is enclosed for the convenience of the Examiner.

The Title and Specification have been amended as requested by the Examiner. Claims 51-55, 77 and 74-78 have been amended to overcome the 35 U.S.C. §112 issues; claims 1, 20, 51 – 54, 71 – 74, 77 – 78 and 88 – 93 have been amended to change “above” to “adjacent” to make the claims more clear; claims 1, 20, 71 – 74, 79 and 90 – 91 have been amended to correct typographical errors in the language; claim 27 has been amended to correct a typographical error; claims 51 – 54 and 75 – 78 have been amended to remove the limitation “a plurality of word lines...” as it was erroneously included in these claims; claims 55 – 59 have been amended to correct dependencies; and claim 72 has been amended to change the final limitation.

Claim Objections

According to the office action, Claim 51 recites the limitation “said control gate” in Line 16. Allegedly there is insufficient antecedent basis for this limitation in the claim. The claim has been amended to remove the limitation which was erroneously included.

According to the Office Action, Claim 52 recites the limitation “said control gate” in Line 16. Allegedly there is insufficient antecedent basis for this limitation in the claim. The claim has been amended to remove the limitation which was erroneously included.

According to the Office Action, Claim 53 recites the limitation “said control gate” in Line 24. Allegedly there is insufficient antecedent basis for this limitation in the claim. The claim has been amended to remove the limitation which was erroneously included.

According to the Office Action, Claim 54 recites the limitation “said control gate” in Line 26. Allegedly there is insufficient antecedent basis for this limitation in the claim. The claim has been amended to remove the limitation which was erroneously included.

According to the Office Action, Claim 75 recites the limitation “said control gate” in Line 15. Allegedly there is insufficient antecedent basis for this limitation in the claim. The claim has been amended to remove the limitation which was erroneously included.

According to the Office Action, Claim 76 recites the limitation “said control gate” in Line 15. Allegedly there is insufficient antecedent basis for this limitation in the claim. The claim has been amended to remove the limitation which was erroneously included.

According to the Office Action, Claim 77 recites the limitation “said control gate” in Line 24. Allegedly there is insufficient antecedent basis for this limitation in the claim. The claim has been amended to remove the limitation which was erroneously included.

According to the Office Action, Claim 78 recites the limitation “said control gate” in Line 24. Allegedly there is insufficient antecedent basis for this limitation in the claim. The claim has been amended to remove the limitation which was erroneously included.

According to the office action: “Claim 55 recites the limitations ‘said first portion and said second portion’ in Lines 2 and 3. There is insufficient antecedent basis for these limitations in the claim.” The claim’s dependency has been corrected from claim 1 to claim 7.

According to the Office Action: “Claim 56 recites the limitations ‘said first portion and said second portion’ in Line 3. There is insufficient antecedent basis for these limitations in the claim.” The claim’s dependency has been corrected from claim 1 to claim 7.

According to the Office Action: “Claim 57 recites the limitations ‘said first portion’ and ‘said second portion’ in Lines 1 and 2. There is insufficient antecedent basis for these limitations in the claim.” The claim’s dependency has been corrected from claim 1 to claim 7.

According to the Office Action: “Claim 58 recites the limitations ‘said first portion and said second portion’ in Lines 2 and 3. There is insufficient antecedent basis for these limitations in the claim.” The claim’s dependency has been corrected from claim 1 to claim 8.

According to the Office Action: “Claim 59 recites the limitations ‘said first portion’, and ‘said second portion’, ‘said retention insulator’ and said ‘second retention insulator.’ There is insufficient antecedent basis for these limitations in the claim.” The claim’s dependency has been corrected from claim 16 to claim 26.

According to the office action: “Applicant is advised that should Claims 71, 73, 75 and 77 be found allowable, Claims 72, 74, 76 and 78, respectively, will be objected to under 37 CFR 1.75 as being substantial duplicates thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).” With this amendment it is submitted that no substantial duplication continues to exist in these claims.

With this amendment it is respectfully submitted the claims satisfy the statutory requirements.

The First 35 U.S.C. § 102 Rejection

Claims 79, 80, 82 to 84 and 86 to 93 stand rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Koyama.¹ This rejection is respectfully traversed.

According to the office action:

“Koyama shows all aspects of the instant invention (e.g. Figures 4) including:

a plurality of nonvolatile memory elements Q arranged in rows and columns (Figure 6)

a semiconductor body 1 of P-type conductivity

first and second semiconductor regions 2a, b of N-type conductivity with a channel 1a between

a polysilicon floating gate 4a and a floating gate dielectric 3a

a retention dielectric 5a of thickness between about 8 to 50 nm

a grid electrode 6

a tunnel dielectric 3b and a tunneling charge injector 10d

¹ U.S. Patent No. 5,517,044.

In reference to the claim language referring to how the charge carriers are injected, intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. *In re Casey*, 152 USPQ 235 (CCPA 1967); *in re Otto*, 136 USPQ 458, 459 (CCPA 1963).”

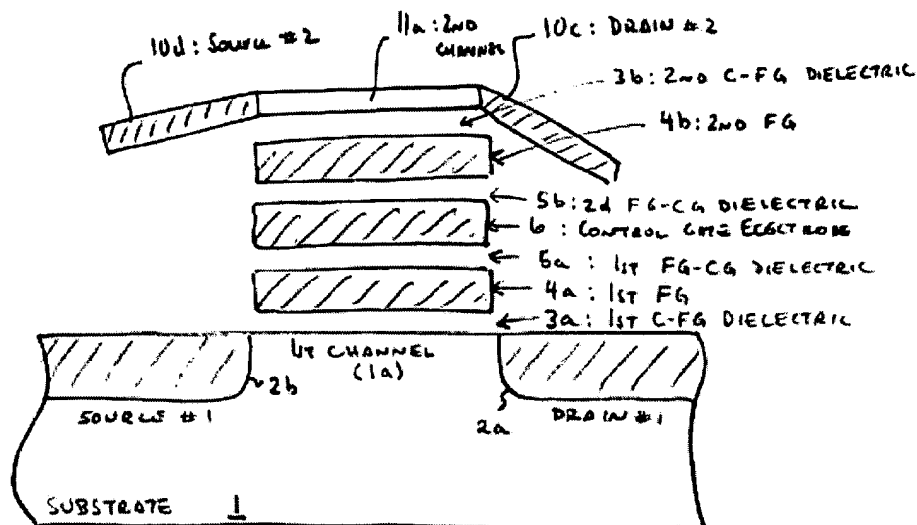
According to the M.P.E.P., a claim is anticipated under 35 U.S.C. § 102(a), (b) and (e) only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.²

If one attempts to read claim 79 (for example) on to the Koyama Fig. 4 device, one is faced with at least one major problem. That is that the “tunneling charge injector” required by the claim must be Koyama’s second floating gate (see Fig. A, element 46). (Fig. A is a simplified diagram illustrating the Fig. 4A/4B/4C embodiment of Koyama).

² Manual of Patent Examining Procedure (MPEP) § 2131. See also *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).



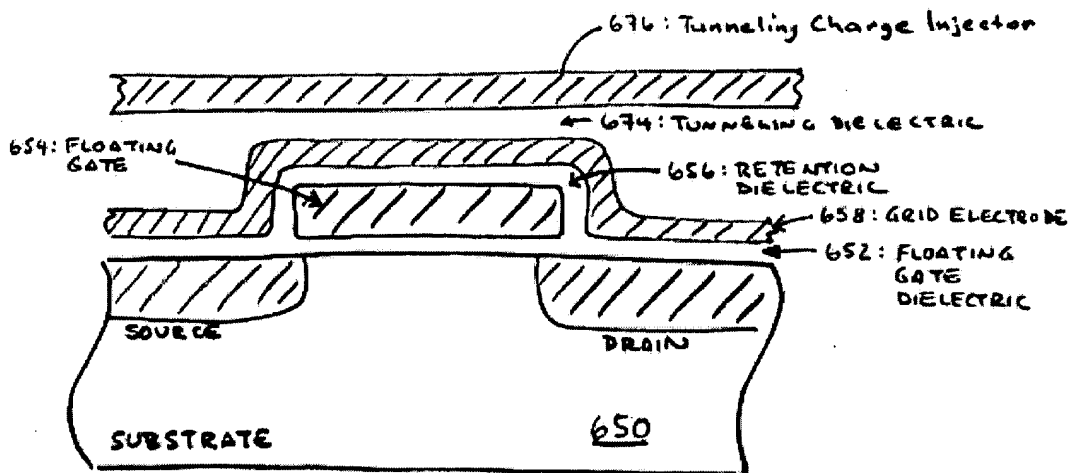
SIMPLIFIED DIAGRAM ILLUSTRATING
THE FIG. 4A/4B/4C EMBODIMENT
OF Koyama (USP 5,517,044)



A

Unfortunately, the floating gate cannot function as a tunneling charge injector because it is floating by definition. It is not hooked to a power supply, it cannot be directly biased and it is completely surrounded by insulating material to prevent it from coming into electrical contact with anything. Paragraph 0132 and Table 1 of the instant disclosure makes it quite clear that the “tunneling charge injector” is to be directly biased. Fig. B is a simplified diagram illustrating the Fig. 28A, 28B, 28C embodiment of the present invention.

SIMPLIFIED DIAGRAM ILLUSTRATING
THE FIG. 28A/28B/28C EMBODIMENT
OF CAYWOOD (09/942,338)



1B

Accordingly, the floating gate 4B of Koyama is clearly not a “tunneling charge injector” and, accordingly, Koyama is an inapposite reference.

The office action purports to avoid this conclusion at paragraph 19 where In re Corey is invoked for the proposition that how the claimed invention operates is irrelevant as long as the asserted prior art structure was capable of performing the intended/claimed use. This does not avoid this consequence because a floating gate (4b) is not capable (by definition) of performing the direct biasing required to be a “tunneling charge injector”.

Accordingly, all of the prior art rejections made herein fail as all of them rely upon Koyama to provide the structure.

The First 35 U.S.C. § 103 Rejection

Claims 1 to 78, 81 and 85 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Koyama and Tobin et al. (U.S. Patent No. 5,972,804). This rejection is respectfully traversed.

According to the office action:

“Koyama shows most aspects of the instant invention (Paragraph 19) except for the grid insulator comprising SiO_xN_y with the oxide less than about 77% or graded, the band gap, bias and fermi level functional limitations and the thickness of the grid electrode. Tobin et al. teach (e.g. Figures 11 and 12) to make insulators comprising SiO_xN_y with the oxide less than about 77% or graded to reduce the amount of leakage current density (Column 14 lines 47 to 49). It would have been obvious to a person of ordinary skill in the art at the time of invention to make insulators comprising SiO_xN_y with the oxide less than about 77% or graded as taught by Tobin et al. in the device of Koyama to reduce the amount of leakage current density.

“In reference to the claim language pertaining to the band gap, bias and fermi level functional limitations, the claiming of a new use, new function, or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 195 USPQ 430, 433 (CCPA 1977) and *In re Swinehart*, 439 F. 2d 210, 169 USPQ 226 (CCPA 1971); please see MPEP § 2112. Since Koyama and Tobin et al. show all the features of the claimed invention, the band gap, bias and fermi level functional limitations are an inherent property of Koyama and Tobin et al.’s invention.

“Since the Applicant has not established the criticality of the thicknesses stated and since the thicknesses are in common use in similar devices in the art, it would have been obvious to one of ordinary skill in the art to use these values in the device of Koyama and Tobin et al. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).”

According to the Manual of Patent Examining Procedure (M.P.E.P.):

To establish a *prima facie* case of obviousness, three basic criteria must be met. First there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant's disclosure.³

The arguments set forth above are equally applicable here. While Tobin et al. discuss the fabrication of a SiOxNy film, Koyama fails to provide the underlying structure. Accordingly, the rejection must be withdrawn.

Judicially-Created Double Patenting

Claims 1-93 stand rejected pursuant to the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-65 of prior United States patent No. 6,534,816. Submitted herewith is a first Terminal Disclaimer executed by an Attorney of Record. Withdrawal of this rejection is respectfully requested.

Claims 1-93 stand rejected pursuant to the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-43 of prior United States patent No. 6,479,863. Submitted herewith is a second Terminal Disclaimer executed by an Attorney of Record. Withdrawal of this rejection is respectfully requested.

Claims 1-93 stand rejected pursuant to the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-59 of prior United States patent No.

³ M.P.E.P § 2143.

6,384,451. Submitted herewith is a third Terminal Disclaimer executed by an Attorney of Record. Withdrawal of this rejection is respectfully requested.

In view of the foregoing, it is respectfully asserted that the claims are now in condition for allowance.

Conclusion

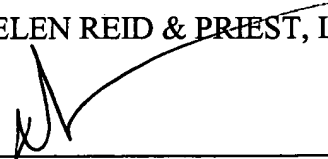
It is believed that this Amendment places the above-identified patent application into condition for allowance. Early favorable consideration of this Amendment is earnestly solicited.

If, in the opinion of the Examiner, an interview would expedite the prosecution of this application, the Examiner is invited to call the undersigned attorney at the number indicated below. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Please charge any additional required fee or credit any overpayment not otherwise paid or credited to our deposit account # 50-1698.

Respectfully submitted,

THELEN REID & PRIEST, LLP



David B. Ritchie
Reg. No. 31,562

Dated: October 6, 2004

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Serial/Patent No.: ~~XXXXXXXXXX~~ 09/942,338

Filing/Issue Date: 8/28/2001

Applicant: John M. Caywood

Title: METHOD AND APPARATUS FOR INJECTING CHARGE ONTO THE FLOATING GATE OF A NONVOLATILE

TRP Docket No.: CAY-006

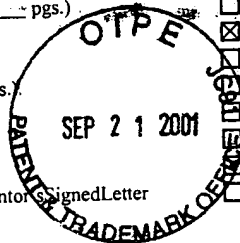
Atty/Secty Initials: DBR/grc

Date Mailed: ~~9/17~~ Sept. 19, 2001

Docket Due Date:

The following has been received in the U.S. Patent & Trademark Office on the date stamped hereon:

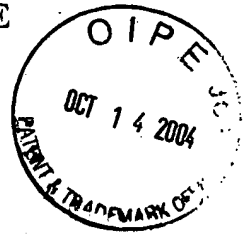
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|--|--|
| <input type="checkbox"/> Amendment/Response (____ pgs.) | <input type="checkbox"/> Drawings: ____ # of sheets includes ____ figures |
| <input type="checkbox"/> Appeal Brief (____ pgs.) (in triplicate) | <input type="checkbox"/> Express Mail No.: |
| <input type="checkbox"/> Application - Utility (____ pgs. with cover & abstract) | <input type="checkbox"/> ____ Month(s) Extension of Time |
| <input type="checkbox"/> ____ Pieces of Prior Art Enclosed | <input checked="" type="checkbox"/> IDS & PTO 1449 (2 pgs.) <input type="checkbox"/> Check No. |
| <input type="checkbox"/> Application - Rule 1.53(b) Continuation (____ pgs.) | <input type="checkbox"/> Issue Fee Transmittal Amt: |
| <input type="checkbox"/> Application - Rule 1.53(b) Division (____ pgs.) | <input type="checkbox"/> Notice of Appeal <input type="checkbox"/> Deposit Acct. No. # 50-1698 |
| <input type="checkbox"/> Application - Rule 1.53(b) CIP (____ pgs.) | <input checked="" type="checkbox"/> Petition for Extension of Time Amt: |
| <input type="checkbox"/> Application - Rule 1.53(d) CPA (____ pgs.) | <input type="checkbox"/> Petition for |
| <input type="checkbox"/> Application - Design (____ pgs.) | <input checked="" type="checkbox"/> Postcard |
| <input type="checkbox"/> Application - PCT (____ pgs.) | Power of Attorney (____ pgs.) |
| <input type="checkbox"/> Application - Provisional (____ pgs.) | Preliminary Amendment (____ pgs.) |
| <input type="checkbox"/> Assignment and Cover Sheet | Reply Brief (____ pgs.) |
| <input type="checkbox"/> Certificate of Mailing | Response to (Notice to File Missing Parts) |
| <input type="checkbox"/> Declaration & POA (2 pgs.) | Request to Incorporate Disclosure Document (____ pgs.) |
| <input type="checkbox"/> Disclosure Docs & Orig & Copy of Inventor Signed Letter (____ pgs.) | <input type="checkbox"/> Transmittal Letter (original & copy) |
| <input checked="" type="checkbox"/> Other: Copies of Cited Art | |



Patent Code:

Client/Matter # 032600 - 000006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



APPLICANT: John M. Caywood
SERIAL NO.: 09/942,338
FILING DATE: August 28, 2001
TITLE: METHOD AND APPARATUS FOR INJECTING CHARGE ONTO
THE FLOATING GATE OF A NONVOLATILE MEMORY CELL
EXAMINER: Not yet assigned
ART UNIT: Not yet assigned

CERTIFICATE OF MAILING

I hereby certify that this paper is being deposited with the United States Postal Service as First Class
Mail in an envelope addressed to: Commissioner for Patents, Washington, DC 20231, on the date
printed below:

Date:

9/19/2001

Name:

Gloria R. Chavarria
Gloria R. Chavarria

COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Each item of information listed in the attached FORM PTO-1449, for which a copy of each is attached, may be material to the examination of the above-identified application and is, therefore, submitted in compliance with the duty of disclosure defined in 37 CFR §§ 1.56, 1.97 and 1.98. The Examiner is requested to make these items of official record in this application.

This Information Disclosure Statement under 37 CFR §§ 1.56, 1.97 and 1.98 is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that any one or more of these items constitutes prior art.

Please note that the parent case, CAY-003 (09/275,168 filed March 24, 1999) was withdrawn from issue and expressly abandoned by applicant because the Morie reference (USP 5,111,430 and JP 2964412) was believed to anticipate or render obvious at least allowed claim 1 of 09/275,168.

I

This statement is filed pursuant to:

(X) 37 C.F.R. § 1.97(b).

This information disclosure statement is filed either (1) within three months of the filing date of a national application other than a continued prosecution application under § 1.53(d); (2) within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; or (3) before the mailing date of a first office action on the merits, whichever event occurs last.

Accordingly, this information disclosure statement requires no fee and no certification.

() 37 C.F.R. § 1.97(c).

This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97 (b), but before the mailing date of either (1) a final action under 37 C.F.R. § 1.113; (2) a notice of allowance under 37 C.F.R. § 1.311; or (3) an action that otherwise closes prosecution in the application.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17 (p) for submission of an information disclosure statement under 37 C.F.R. § 1.97 (c) (\$180); or a certification according to 37 C.F.R. § 1.97 (e).

() 37 C.F.R. § 1.97(d).

This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97 (c).

Accordingly, this information disclosure statement requires the fee specified in 37 C.F.R. § 1.17 (p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d) (\$180), and a certification according to 37 C.F.R. § 1.97(e).

If this statement crosses in the mail with an office action, or is otherwise not in the indicated category of 37 C.F.R. § 1.97, it is respectfully requested that this statement be

treated in the next appropriate category and made of record. To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

II

- (X) No fee is due.
- () The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) is enclosed (\$180).

Please charge any additional required fee or credit any overpayment to our deposit account number 50-1698. An additional copy of this page is enclosed.

III


Pursuant to 37 C.F.R. § 1.97(e), I certify:

- (X) No certification is necessary.
- () (1) Each item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the statement.
- () (2) No item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, or, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. § 1.56(c), more than three months prior to the filing of the statement.

Dated: 9/18, 2001

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Respectfully submitted,
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treated in the next appropriate category and made of record. To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

II

- (X) No fee is due.
- () The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) is enclosed (\$180).

Please charge any additional required fee or credit any overpayment to our deposit account number 50-1698. An additional copy of this page is enclosed.

III

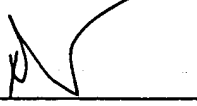
Pursuant to 37 C.F.R. § 1.97(e), I certify:

- (X) No certification is necessary.
- () (1) Each item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the statement.
- () (2) No item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, or, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. § 1.56(c), more than three months prior to the filing of the statement.

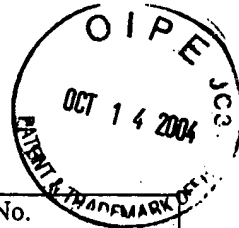
Dated: 9/18, 2001

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Form PTO 1449 (Rev. 2-32) U.S. Department of Commerce Patent and Trademark Office				Atty. Docket No. CAY-006		Serial No. 09/943,338		
Information Disclosure Statement by Applicant				Applicant: John M. Caywood				
(Use several sheets if necessary)				Filed: 8/28/2001 Group: (to be assigned)				
U.S. Patent Documents								
Init.		Document No.	Date	Name	Class	Subclass	Filing Date	
	A	3,778,645	12/11/73	Mattauch et al.	307	318	1/31/72	
	B	4,035,820	7/12/77	Matzen	357	23	12/29/75	
	C	4,037,242	7/19/77	Gosney	357	23	12/29/75	
	D	4,513,397	4/23/85	Ipri et al.	365	185	12/10/82	
	E	4,626,887	12/2/86	Schmitt-Landsiedel et al.	357	43	8/2/84	
	F	4,630,081	12/16/86	Calviello	357	6	12/19/84	
	G	4,686,558	8/11/87	Adam	357	42	9/1/83	
	H	4,752,912	6/21/88	Guterman	365	185	7/22/85	
	I	4,907,197	3/6/90	Uchida	365	185	7/12/88	
	J	4,907,198	3/6/90	Arima	365	185	11/2/88	
	K	4,910,565	3/20/90	Masuoka	357	23.5	5/12/88	
	L	4,924,437	5/8/90	Paterson et al.	365	185	12/9/87	
	M	4,967,393	10/30/90	Yokoyama et al.	365	185	1/3/90	
	N	5,101,249	3/31/92	Hijiya et al.	357	23.5	5/6/86	
	O	5,111,430	5/5/92	Morie	365	185	6/21/90	
	P	5,235,544	8/10/93	Caywood	365	185	11/9/90	
	Q	5,338,952	8/16/94	Yamauchi	257	315	9/13/93	
	R	5,359,571	10/25/94	Yu	365	230.03	1/25/94	
	S	5,838,039	11/17/98	Sato et al.	257	321	7/8/96	
	T	5,841,161	11/24/98	Lim et al.	257	315	3/3/97	
	U	5,946,240	8/31/99	Hisamune	365	185.28	12/23/97	
	V	5,977,586	11/2/99	Crisenza et al.	257	326	5/31/95	
	W	6,002,152	12/14/99	Guterman et al.	257	316	12/9/98	
Foreign Documents								
							Translation	
Init.		Document No.	Date	Country	Class	Subclass	Yes	No
	X	2964412	10/18/99	Japan			X	

Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)		
	Y	Dons, et al., "Direct Tunneling Diode Structure with a Multi-Layer Charge Injection Barrier", <i>29th IEEE Semiconductor Interface Specialists Conference</i> (1998)
	Z	Guo, Xin, "Tunneling Leakage Current in Oxynitride: Dependence on Oxygen/Nitrogen Content", <i>IEEE, Electron Device Letters</i> , Vol. 19, No. 6, pp. 207-209 (1998)
	AA	Huber et al, "Hot-Electron Transport in Al-Al ₂ O ₃ Triodes Produced by Plasma Oxidation", <i>Journal of Applied Physics</i> , Vol. 39, No. 11, pp. 5104-5116 (1968)
	BB	Krolikowski, "Photoemission Studies of the Noble Metals. I. Copper", <i>Physical Review</i> , Vol. 185, No. 3, pp. 882-900 (1969)
	CC	Krolikowski, "Photoemission Studies of the Noble Metals II. Gold", <i>Physical Review B</i> , Vol. 1, No. 2, pp. 478-487 (1970)
	DD	Mead, "Operation of Tunnel-Emission Devices", <i>J. Appl. Phys.</i> , Vol. 32, No. 4 (1961)
	EE	Mead, "The Tunnel-Emission Amplifier", <i>Proceedings of IRE</i> , pp. 359-361 (1960)
Examiner		Date Considered
Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include a copy of this form with the next communication to applicant.		

